

SKRIPSI SARJANA FARMASI

**INDUKSI PRODUKSI SENYAWA METABOLIT
SEKUNDER JAMUR *Penicillium citrinum* Dc04
DENGAN METODE OSMAC DAN UJI AKTIVITAS
ANTIMIKROBA**



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ABSTRAK

INDUKSI PRODUKSI SENYAWA METABOLIT SEKUNDER JAMUR *Penicillium citrinum* Dc04 DENGAN METODE OSMAC DAN UJI AKTIVITAS ANTIMIKROBA

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Kultivasi jamur *Penicillium citrinum* Dc04 pada media beras dengan penambahan 3,5% NaNO₃ dan 3,5% monosodium glutamat (MSG) menyebabkan perubahan produksi senyawa metabolit sekunder dibandingkan dengan jamur yang tumbuh pada media beras (media kontrol). Ekstrak etil asetat jamur *Penicillium citrinum* Dc04 dari tiga media tersebut dikarakterisasi menggunakan LC-MS/MS. Aktivitas antimikroba ketiga ekstrak ditentukan dengan metode difusi agar terhadap beberapa mikroba patogen. Aktivitas antimikroba masing-masing ekstrak kemudian ditentukan berdasarkan konsentrasi hambat minimum (KHM). Berdasarkan hasil penelitian, ekstrak jamur dengan media kontrol menghasilkan 20 senyawa metabotit sekunder. Media kultivasi beras ditambah 3,5% NaNO₃ dan 3,5% monosodium glutamat masing-masing menghasilkan 23 dan 27 senyawa. Hasil perbandingan data tersebut menunjukkan keberadaan 14 senyawa baru yang dihasilkan jamur pada media 3,5% NaNO₃ dan 16 senyawa baru dihasilkan pada media 3,5% monosodium glutamat. KHM dari ekstrak jamur pada media kontrol, media MSG, dan media NaNO₃ terhadap bakteri *Staphylococcus aureus* ATCC25923 berurutan sebesar 0,625%, 2,5%, 1,25%. KHM terhadap bakteri *Escherichia coli* ATCC25922 berurutan 1,25%, 5%, 2,5%. KHM terhadap bakteri MRSA berurutan 2,5%, 5%, 2,5%. Ketiga ekstrak tidak memiliki daya hambat terhadap jamur *Candida albicans*. Berdasarkan penelitian ini, dapat disimpulkan bahwa penambahan 3,5% MSG dan 3,5% NaNO₃ pada media beras dapat menginduksi pembentukan metabolit sekunder baru pada jamur *Penicillium citrinum* Dc04.

Kata kunci: *Penicillium citrinum*, OSMAC (*One Strain Many Compound*), LC-MS/MS, Aktivitas Antimikroba, Konsentrasi Hambat Minimum (KHM)

ABSTRACT

INDUCTION OF SECONDARY METABOLITES PRODUCTION FROM THE FUNGUS OF *Penicillium citrinum* Dc04 THROUGH AN OSMAC METHOD AND TESTING OF ANTIMICROBIAL ACTIVITY

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Cultivation of the fungus *Penicillium citrinum* Dc04 in rice media with the addition of 3.5% NaNO₃ and 3.5% monosodium glutamate (MSG) caused changes in the production of secondary metabolites compared to those that grow only on rice media (control media). The ethyl acetate extract of *Penicillium citrinum* Dc04 from these mediums was analyzed using LC-MS/MS. The antimicrobial activity of the extracts was determined by the agar diffusion method against several pathogenic microbes and based on the minimum inhibitory concentration (MIC). Based on the results, the control media extract produced 20 secondary metabolites. The rice media with 3.5% NaNO₃ and 3.5% monosodium glutamate yielded 23 and 27 compounds. The comparison of these data shows the presence of 14 new compounds produced by fungus on 3.5% NaNO₃ media and 16 new compounds produced on 3.5% monosodium glutamate media. MIC from fungal extracts on control media, MSG media, and NaNO₃ against *Staphylococcus aureus* ATCC25923 respectively 0.625%, 2.5%, 1.25%. MIC against *Escherichia coli* ATCC25922 were 1.25%, 5%, 2.5%. MIC against MRSA were 2.5%, 5%, 2.5%. None of these extracts had inhibitory activity against *Candida albicans*. Based on this study, it can be concluded that the addition of 3.5% MSG and 3.5% NaNO₃ to rice media can induce the production of new secondary metabolites in the fungus *Penicillium citrinum* Dc04.

Keywords: *Penicillium citrinum*, OSMAC (One Strain Many Compound), LC-MS/MS, Antimicrobial Activity